

SERVICE MANUAL

CTCSS ENCODE ONLY

MODEL MA-121

COMMUNICATIONS INC.

3100

3100

3100

3100

3100

3100

INSTALLATION INSTRUCTIONS

CTCSS ENCODE ONLY FIELD INSTALLATION KIT

WARNING! Take care to install the tone board properly. Refer to either Fig. 1, 2 or 5 for proper orientation.

A. GENERAL

This kit consists of a single circuit board intended for installation in the following Regency Transceiver models. In performing this installation, it will be helpful to have the referenced service manuals.

1. MICRO-COM U11, MICRO-COM U12 and MICRO-COM U14
(publication SM-10-843)
2. MICRO-COM U11H, MICRO-COM U12H and MICRO-COM U14H
(publication SM-10-843, plus High Band Addendum)
3. MICRO-COM U01 and MICRO-COM U04
(publication SM-10-843, plus Low Power Addendum)
4. MICRO-COM U11B, MICRO-COM U14B
(publication SM-40-045)
5. BTH-201B
(publication SM-10-388) NOTE: This CTCSS kit is only applicable on BTH-201B Base Stations produced after October, 1975. These can be identified by noting the microphone connector. Those with a five pin connector will accept the MA-116 kit.)

B. INSTALLATION INSTRUCTIONS FOR INSTALLATION IN:

MICRO-COM U11
MICRO-COM U12
MICRO-COM U14
MICRO-COM U11H
MICRO-COM U12H
MICRO-COM U14H
MICRO-COM U01
MICRO-COM U04

1. Remove the transceiver from its case, and remove the loudspeaker with its brackets.
2. The shield area that accepts the CTCSS module is located in the transmitter portion, toward the front of the radio. The receptacle for the tone board is located in this shielded area. Refer to Figure 1.
3. Plug the tone board into the receptacle.
NOTE: The following instructions assume that the tone board has been adjusted to the proper CTCSS frequency. If this is not so, carry out the adjustments outlined under the "Tone Frequency Setting Adjustments" section before proceeding.

4. Adjustment Procedure (Setting Tone Modulation Deviation)

Adjust R618, on the tone encode board to obtain a tone modulation deviation of plus and minus 500 Hz. Then, insert a 100 millivolt, 1,000 Hz tone into pin four of the microphone jack, and adjust R240, (the transmitter deviation control on the transceiver) to obtain plus and minus 5 KHz peak modulation deviation. If R240 was changed much, remove the 1,000 Hz tone, and readjust R618 to obtain a tone squelch modulation deviation of plus and minus 500 Hz.

5. Fasten the loudspeaker back in place, and put the transceiver back in its case.

C. INSTRUCTIONS FOR INSTALLATION IN:

MICRO-COM U11B
MICRO-COM U14B

1. Remove the transceiver from its case.
2. The shield area that accepts the CTCSS module is located in the transmitter portion, toward the right rear of the radio. The receptacle for the tone board is located in this shielded area. Refer to Figure 3.

3. Plug the tone board into the receptacle.

NOTE: The following instructions assume that the tone board has been adjusted to the proper CTCSS frequency. If this is not so, carry out the adjustments outlined under the "Tone Frequency Setting Adjustments" section before proceeding.

4. Adjustment Procedure (Setting Tone Modulation Deviation)

Adjustment R618, on the tone encode board to obtain a tone modulation deviation of plus and minus 500 Hz. Then, insert a 100 millivolt, 1,000 Hz tone into pin four of the microphone jack, and adjust R240, (the transmitter deviation control on the transceiver) to obtain plus and minus 5 KHz peak modulation deviation. If R240 was changed much, remove the 1,000 Hz tone, and readjust R618 to obtain a tone squelch modulation deviation of plus and minus 500 Hz.

5. Put the transceiver back in its case.

D. INSTRUCTIONS FOR INSTALLATION IN:

BTH-201B NOTE: These instructions are for installing the MA-121 in BTH-201B models manufactured after October, 1975. These units may be identified by noting the microphone connector. Those with a five pin connector will accept the MA-121 kit.

1. Remove the transceiver from its case.
2. The connector that accepts the tone encode circuit board is shown in Figure 5.

3. If a shorting jumper connector is present on pins J and L of the tone board receptacle (pins J and L are at one end of the connector). Remove this shorting jumper. In radios not equipped with tone, this jumper serves the purpose of providing a path for the receiver audio. (Pins J and L on the tone encode board are connected together, and therefore maintain this path when the encoder is plugged in.)
4. Plug the tone encode circuit board into the receptacle.
NOTE: The following instructions assume that the tone board has been adjusted to the proper CTCSS frequency. If this is not so, carry out the adjustments outlined under the "Tone Frequency Setting Adjustments" section before proceeding.
5. Adjustment Procedure (Setting Tone Modulation Deviation)

Adjust R618, on the tone encode board to obtain a tone modulation deviation of plus and minus 500 Hz. Then, insert a 100 millivolt, 1,000 Hz tone into pin four of the microphone jack, and adjust R228, the transmitter deviation control to obtain plus and minus 5 KHz peak modulation deviation. If R228 was changed much, remove the 1,000 Hz tone, and readjust R618 to obtain a tone squelch modulation deviation of plus and minus 500 Hz.

MA-121 TONE SQUELCH (CTCSS) OPTION

GENERAL DESCRIPTION

The Model MA-121 Tone Squelch System is supplied as a factory installed, or field installed option for a variety of Regency transceivers. This option equips the radio for encode only operation on systems using Continuous Tone Controlled Squelch Systems (CTCSS).

The circuit elements of the MA-121 tone squelch system are mounted on a plug in printed circuit board.

CIRCUIT DESCRIPTION

A block diagram of the encode only circuit board is shown on Figure 6, and a circuit diagram is shown in Figure 7.

The operating frequency of the tone system is controlled by an Active filter, consisting of IC601B, IC602A, and IC602B. This filter is a high Q, bandpass filter, that can be tuned for operation on any of the CTCSS tone frequencies. The components of the filter which determine the operating tone are precision resistors and condensers; R601, R602, R603, R604, R605, R606, R607, C601, and C602.

IC603A is an integrated circuit operational amplifier, used as a limiting amplifier. It is connected between one of the inputs and one of the outputs of the active filter described above. This limiting amplifier thus serves as a feedback path which causes the total circuit to oscillate at a frequency determined by the active filter. The limiting action of IC603 serves to keep the level of oscillation from overloading the active filter, thus keeping the output from the active filter sinusoidal.

TONE SETTING INSTRUCTIONS

The tone frequency is determined by (a) the insertion of jumpers to determine which of three bands of operation is desired, and (b) the adjustment of a precision potentiometer to determine the specific tone frequency.

For purposes of installing the jumpers, the total CTCSS frequency is divided into three bands, the low band being 67.0 Hz to 110.9 Hz; the middle band 114.8 Hz to 192.2 Hz, and the high band 203.5 Hz to 253.0 Hz.

INSTALL JUMPERS FOR THE PROPER BAND

Figure 8 shows the jumper locations. Determine which band includes the desired frequency, and insert (or remove) jumpers according to the following chart:

67.0 Hz to 110.9 Hz	Low Band	JU601, JU602, JU603, JU604 are all removed.
114.8 Hz to 192.4 Hz	Middle Band	JU601, JU603 in place. JU602, JU604 removed.
203.5 Hz to 253.0 Hz	High Band	JU602, JU604 in place. JU603, JU605 removed.

After soldering or unsoldering jumpers, at least five minutes should elapse before making any final frequency adjustment. This is necessary to permit the precision resistors and capacitors in the vicinity of the soldering points to stabilize in temperature.

Final frequency adjustment may be made with the tone board installed in the radio, or it may be made prior to installation in the radio. If adjusted outside of the radio, connect a 13.8 volt source to the tone board, with the positive terminal going to point M and the negative terminal going to point E(gnd). If adjusted inside the radio, put the unit into the "monitor and transmit" condition by lifting the microphone off the hook. Turn the tone output potentiometer R618 fully clockwise and connect the tone measuring equipment to point F. Then carefully adjust precision potentiometer R601 to obtain the wanted tone frequency. Turning R601 clockwise increases frequency.

TONE SETTING PRECAUTIONS

Accurate frequency setting is necessary on CTCSS (tone squelch) systems. When making the above frequency adjustments, be sure that you set the tone as precisely as possible. If the tone board is to operate on a system using reed type tone boards, be sure that your frequency setting is within .1 or .2 Hz if possible. Especially on reed tone systems, it is advisable to measure the tone frequency of several of the existing units; it is not safe to assume that the system is really operating on exactly the frequency stamped on the nameplates.

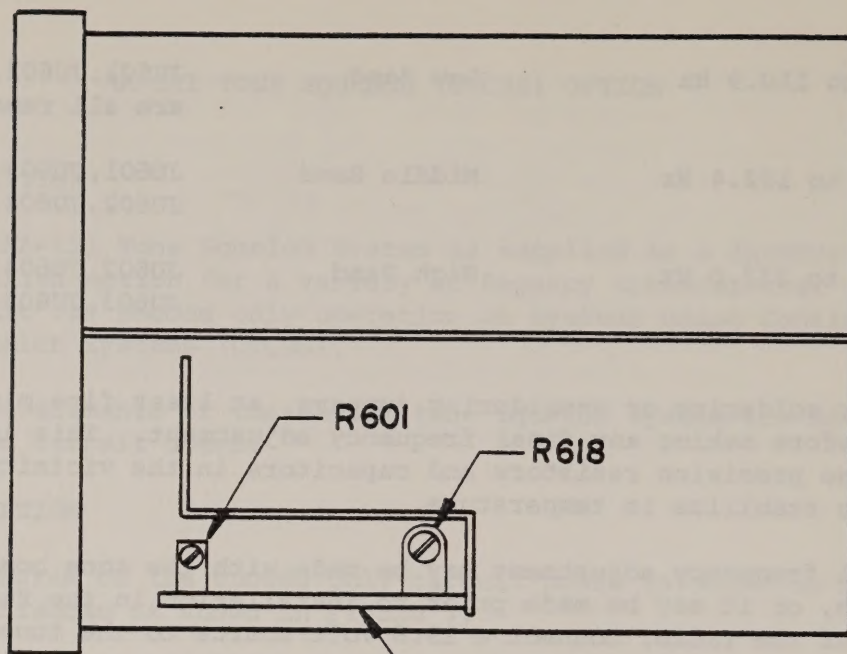


FIG 1

**R240 DEVIATION
CONTROL**

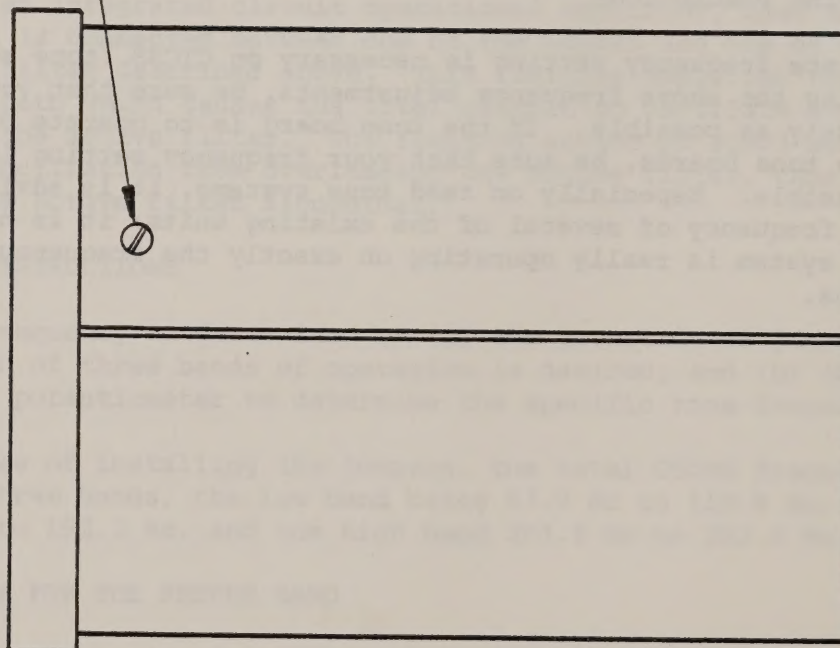


FIG 2

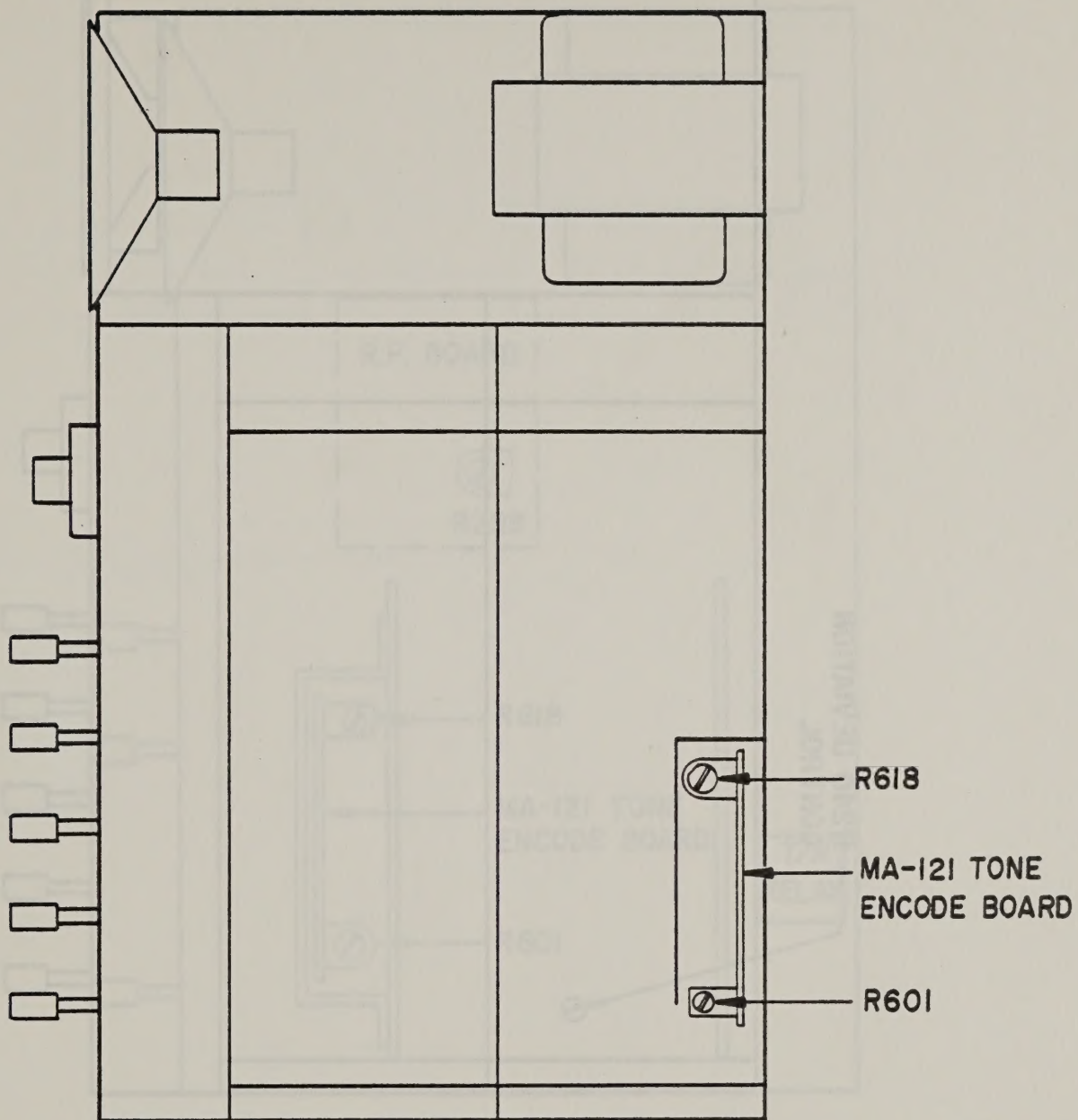


FIG 3

R240 DEVIATION
CONTROL

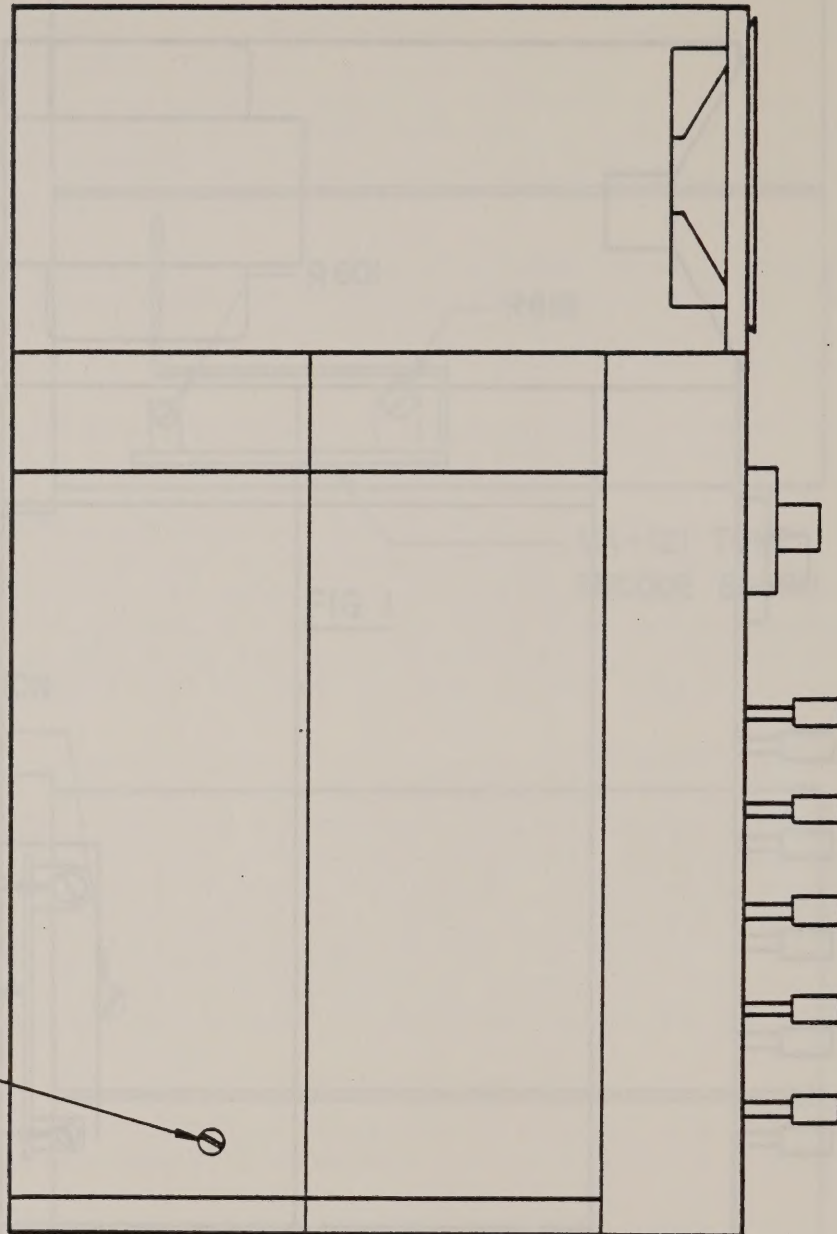


FIG 4

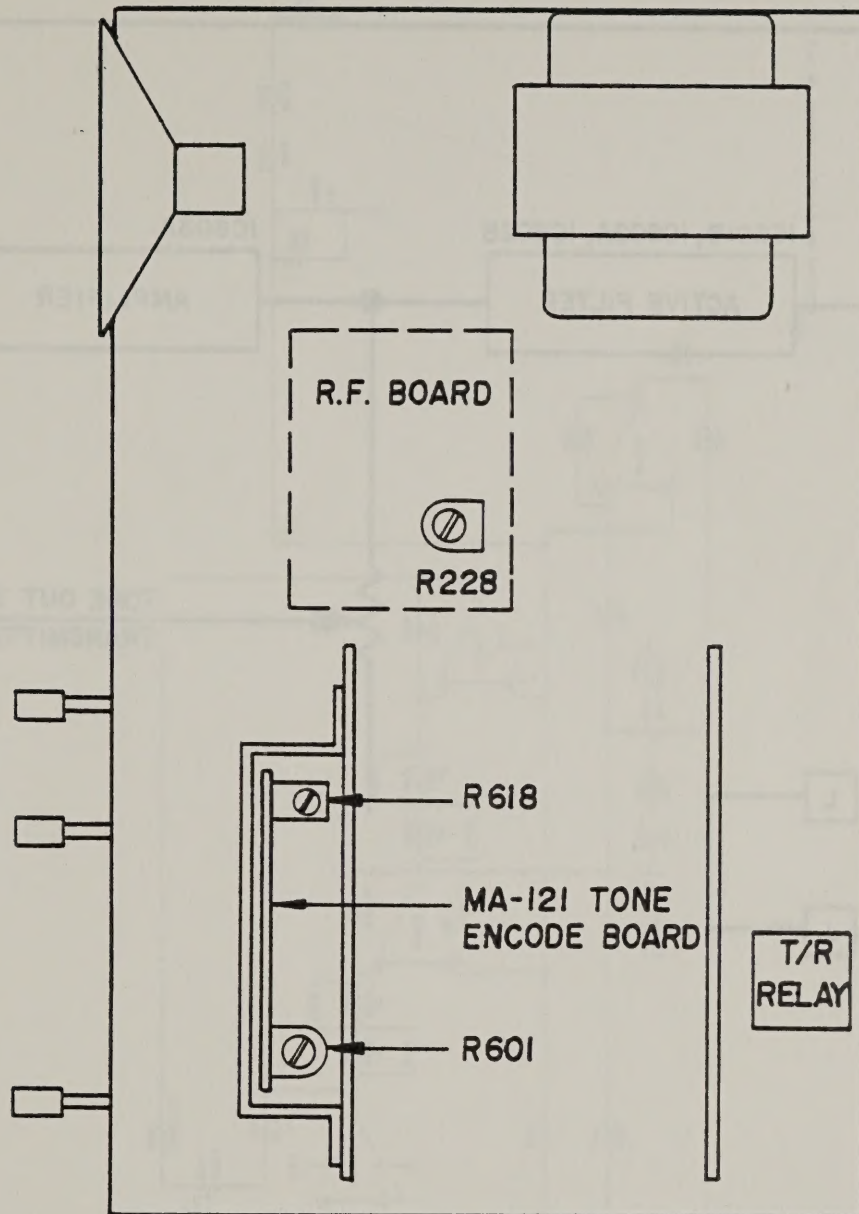


FIG 5

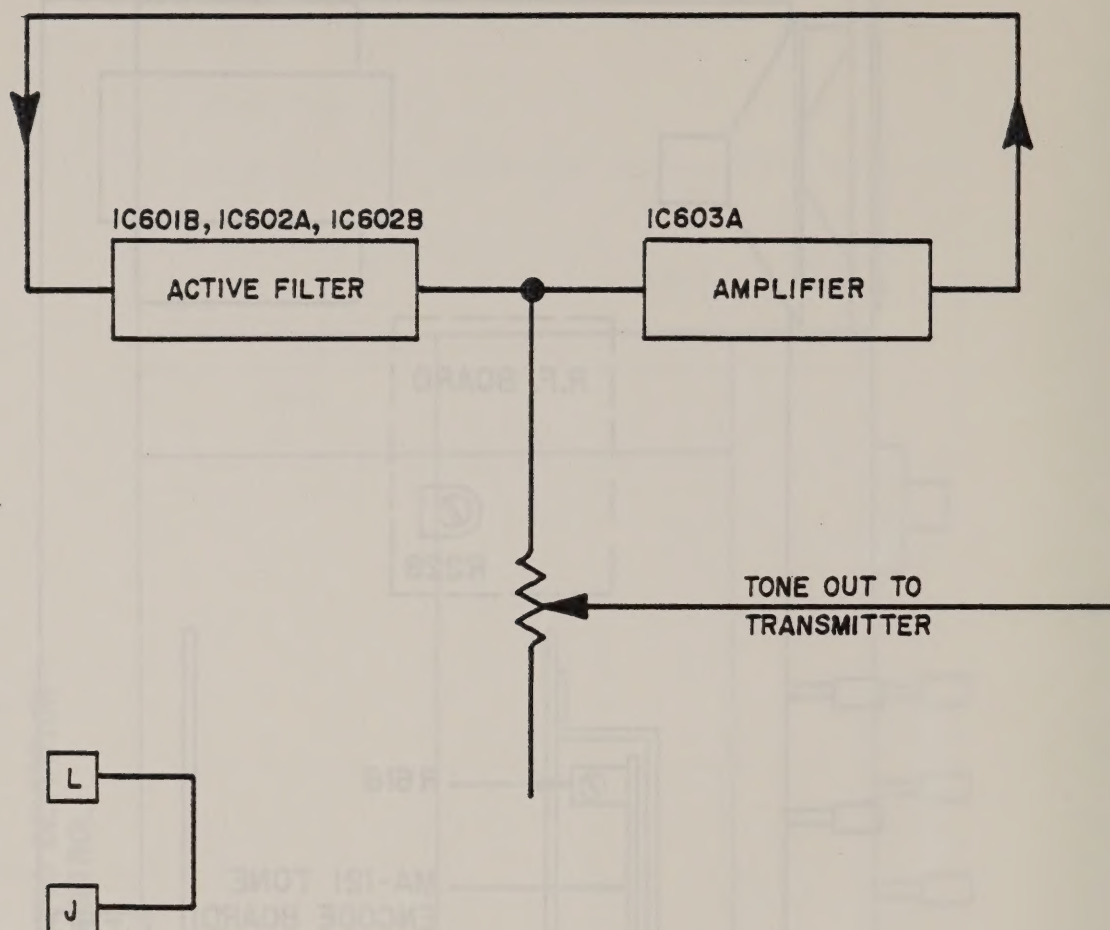
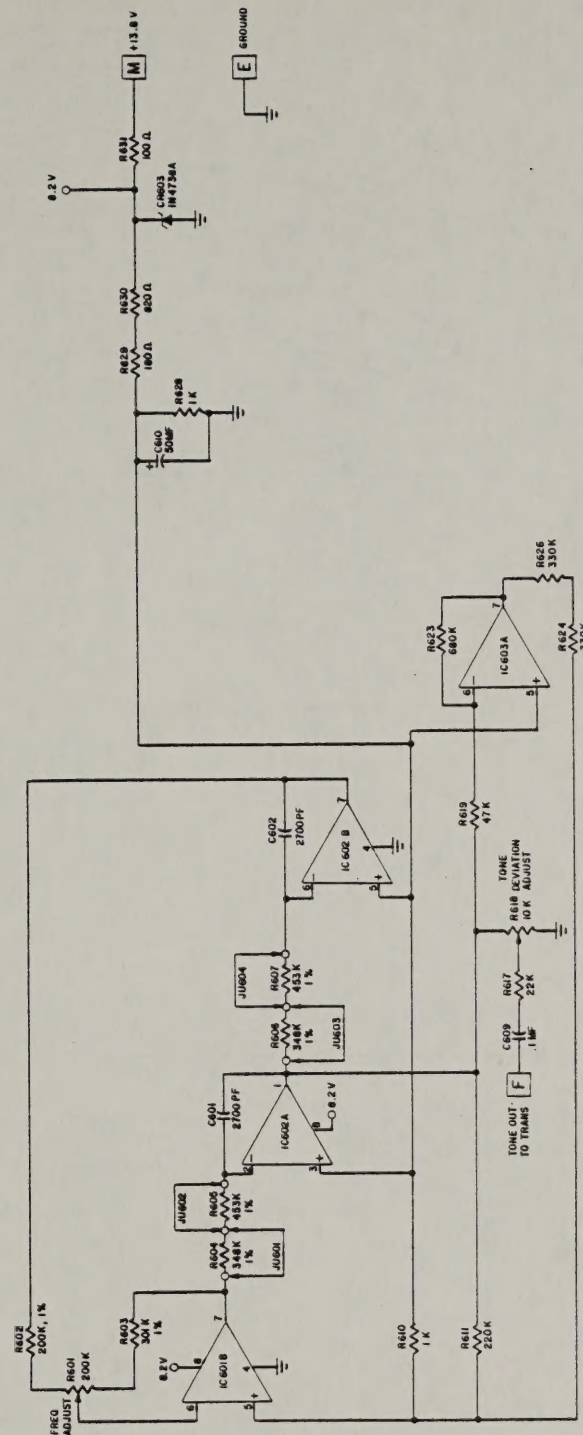
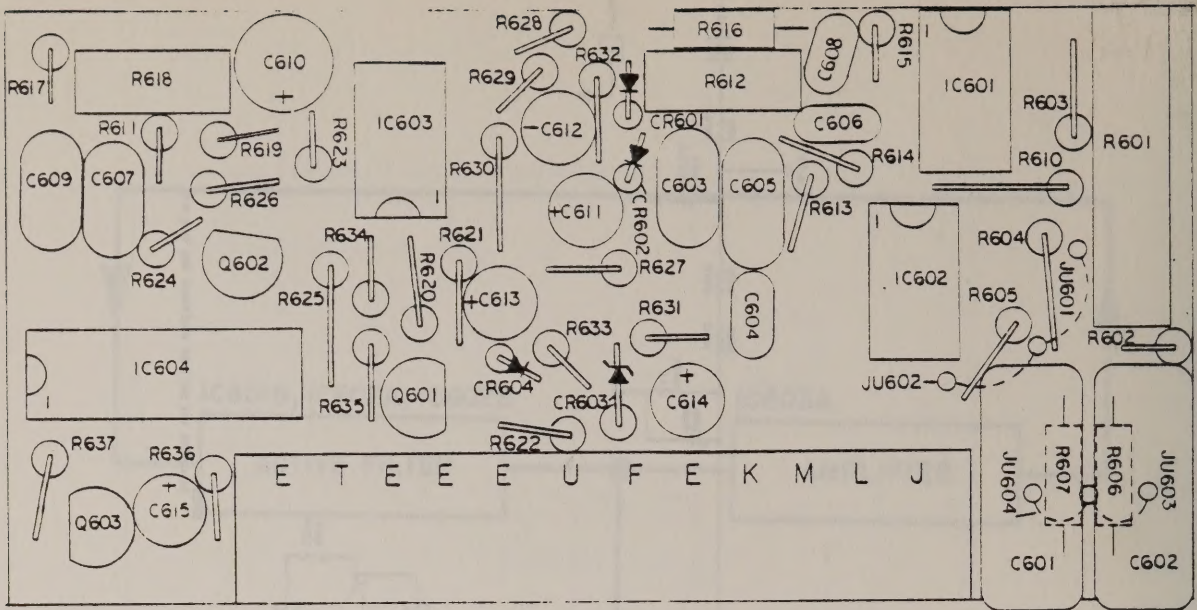


FIG 6 BLOCK DIAGRAM

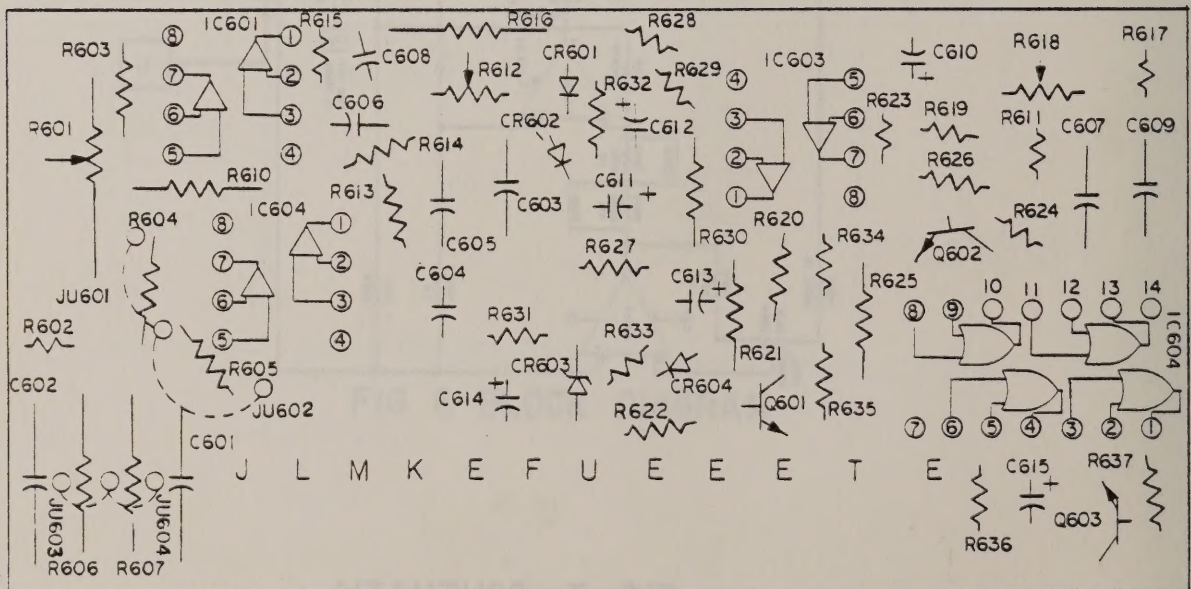


NOTES
1. RESISTORS NOT SPECIFIED OTHERWISE ARE 1/4W, 10%.

FIG 7 SCHEMATIC



TOP VIEW



BOTTOM VIEW

FIG 8